Calculations of Neutron and Proton Induced Reaction up to 200 MeV for Target ^{238}U

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In recent years, the accelerator-driven system (ADS) has been an interesting focus in nuclear physics, China has also paid great attention to this field. To satisfy the demands of intermediate energy nuclear data fromADS project of China, two programs for calculating nuclear data in medium energy region are being developed: MEND for medium-heavy nucleus ($Z < 71$) and MENDF for fission and subfission nucleus ($Z > 70$). Both programs are constructed within the framework of optical model, intranuclear cascade nucleon emission mechanism based on empirical formula, preequilibrium statistical theory based on exciton model and the evaporation model; the Hauser-Feshbach theory with width fluctuation correction is also introduced for first particle emission in low energy region, Bohr-Wheeler formula was used in fission width calculation. The direct inelastic and reaction cross section as well as angular distribution, which can be calculated with the code DWUCK4 and/or ECIS94, are as input for both MEND and MENDF.

In both programs, the projectile and emitting particle can be neutron, proton, ^{4}He, deuteron, triton and ^{3}He; all reactions in first, second, third, ... up to 18th particle emission and fission process are in considered. All reaction cross sections and energy spectra of 6 kinds of emitting particles, gamma rays and all kinds of recoil (residual) nuclei can be calculated, the double-differential cross section of 6 kinds of emitting particles can also be calculated with Kalbach systematics. Besides, in MENDF, the mass and charge distribution as well as the kinetic energy distribution of fission fragments, ν-values and energy spectra of fission neutrons can also be calculated.

The calculations of neutron and proton induced reaction Up to 200 MeV for target ^{238}U with MENDF are performed, the calculated results are generally in rather good accordance with experimental data and reasonable in physics.

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